FORT BELKNAP BROWNFIELDS TRIBAL RESPONSE
PHASE III ESA: ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES
LODGEPOLE COMMUNITY HALL

PREPARED FOR:

FORT BELKNAP INDIAN COMMUNITY
FORT BELKNAP INDIAN RESERVATION
ENVIRONMENTAL PROTECTION DEPARTMENT
R.R. 1, BOX 66
FORT BELKNAP AGENCY
HARLEM, MT 59526

PREPARED BY:

PORTAGE, INC.
1065 N. EWING
HELENA, MT 59601

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ABCA	Analysis of Brownfields Cleanup Alternatives
ACM	asbestos containing material
AHERA	Asbestos Hazard Emergency Response Act
ARM	Administrative Rules of Montana
AST	aboveground storage tank
BTEX	benzene toluene ethylbenzene xylene
CAA	Clean Air Act
CFR	Code of Federal Regulations
CMP	corrugated metal pipe
EPA	U.S. Environmental Protection Agency
EPH	extractable petroleum hydrocarbons
ESA	Environmental Site Assessment
FBIC	Fort Belknap Indian Community
LBP	lead based paint
LPCH	Lodgepole Community Hall
LUST	leaky underground storage tank
MCA	Montana Code Annotated
NESHAP	National Emissions Standards for Hazardous Air Pollutants
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCM	phase contrast microscopy
PCOC	potential contaminants of concern
PID	photo ionization detector
PLM	polarized light microscopy
RACM	regulated asbestos containing material
RBSL	Risk Based Screening Level
STEL	short term exposure limit
TEM	transmission electron microscope
TSCA	Toxic Substances Control Act
TWA-PEL	time weighted average – permissible exposure limit
UST	underground storage tank
VPH	volatile petroleum hydrocarbons
XRF	X-Ray fluoroscope

1.0 INTRODUCTION

This Analysis of Brownfields Cleanup Alternatives (ABCA) has been prepared in order to evaluate possible cleanup alternatives for remediation of the Lodgepole Community Hall (LPCH) site. Site abatement is required to mitigate both human health and environmental risk, as well as provide a means for the Fort Belknap Indian Community (FBIC) to meet the future site reuse goals of the LPCH. Following renovation and restoration of the LPCH to its original state, the Fort Belknap Indian Community Council and Fort Belknap community's vision includes using the facility to host community functions and cultural events, and as an attraction in the overall Tourism Plan for the Fort Belknap Reservation.

2.0 SITE CHARACTERIZATION

This section includes discussion of both the site description and site background including available data regarding the physical, demographic, and other characteristics of the site; previous removal actions and site investigations; the source, nature, and extent of contamination including analytical data; exposure pathways and associated risk; as well as applicable cleanup standards and laws.

2.1 Site Description and Background

The Lodgepole Community Hall (LPCH) is located on property owned by FBIC in Lodgepole, Section 5, T26N, R25E, Principal Montana Meridian, Blaine County, Montana (Figure 1). The 2000 U.S. Census indicated that 225 people reside in the community of Lodgepole. The site is situated adjacent to Tribal Route #8, west of Lodgepole Creek, and immediately south of the former Lodgepole Elementary School. The site contains Veteran's Park, with associated picnic tables and awnings.

FIGURE 1. GENERAL LPCH SITE LOCATION

The LPCH sits at an elevation of approximately 3,520 feet above mean sea level within the narrow valley of Lodgepole Creek, located on terrain that ranges from relatively flat to rolling foothills at the base of the Little Rocky Mountains. Site surface water drains eastward, towards Lodgepole Creek. The water table is approximately 18 feet below the land surface. Soils consist of alluvial parent material that is well drained. Depth to a restrictive root layer is greater than 60 inches, with water highly available within this zone. Soils can be characterized as Straw-Korent loams and Typic Ustifluvents (wet soil series), ranging from clay loam to silty-clay loam to

sandy-clay loam according to the United States Department of Agriculture. The LPCH has reportedly not been used since the 1990s. The log-structured building is of single level construction with a total area of approximately 5,000 square feet (excluding the basement); interior finishes are primarily of wood lathe and plaster. The building has deteriorated significantly due to adverse conditions, vandalism, use by birds and rodents, and lack of maintenance.

The LPCH, built in the 1930's, was used for community events and gatherings for approximately 60 years before closing in the early 1990s. Activities hosted at the LPCH site included powwows, children's programs, sporting events, and dances. On February 24, 2000, the building was listed by the Montana Historical Society in the National Register of Historic Places in accordance with the National Historic Preservation Act of 1986. The FBIC has acquired funds to begin the renovation of the site.

2.2 Previous Removal Actions

No previous removal actions have taken place at the LPCH site. However, three registered underground storage tanks (USTs) were identified on the adjoining former Lodgepole Elementary School property to the north of the LPCH during Phase I ESA activities. All three tanks were closed and removed from the ground on June 10, 1999, according to tank/piping closure forms submitted by tank closure contractor Pine Street, Inc., and received by the Montana Department of Environmental Quality (MDEQ) July 10, 1999. Soil samples taken during UST removal indicated concentrations of gasoline and diesel range organic concentrations below the most conservative MDEQ risk based screening levels. The petroleum release site was closed by MDEQ on February 24, 2000.

2.2.1 Previous Site Investigations

Phase I and Phase II Environmental Site Assessments (ESA) have been conducted at the LPCH site. Tetra Tech conducted Phase I activities in accordance with their Sampling and Analysis Plan dated July 18, 2006 and executed agreement dated April 14, 2006. Primary objectives of the Phase I ESA were dissemination and evaluation of user provided information, site description, record review, site reconnaissance, conclusions, and proposition of recommendations. During Phase I site reconnaissance, Tetra Tech identified homogenous areas for asbestos containing materials (ACM) and lead based paint (LBP). Bulk material samples were analyzed for ACM, and LBP was analyzed by use of an X-Ray fluoroscope (XRF).

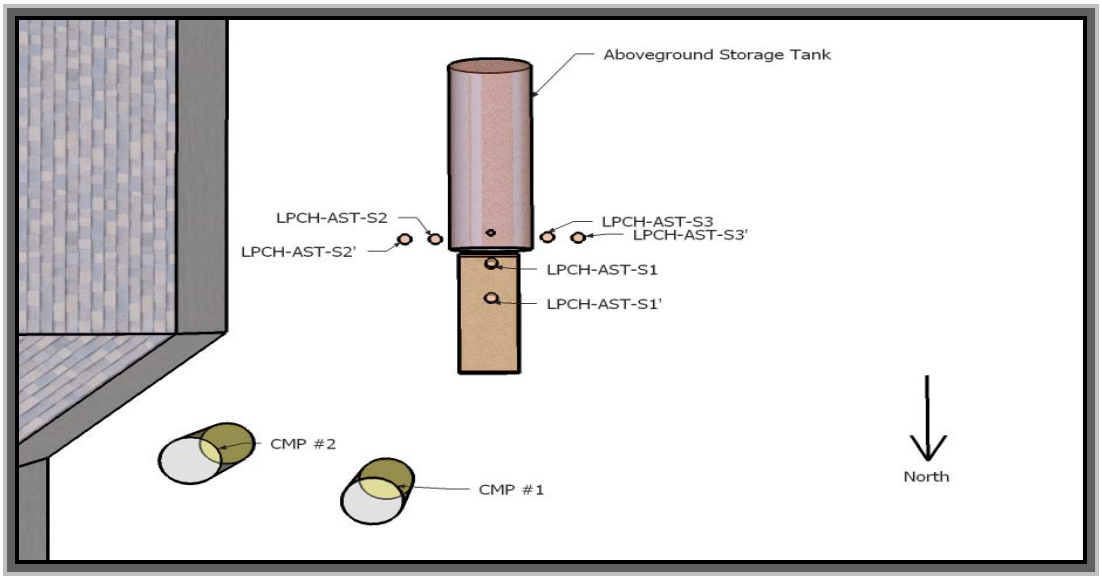
Phase II ESA activities were conducted by Portage in accordance with an approved Site Assessment Work Plan (Portage, September 2007). Field work took place September 26-27, 2007, and consisted of collecting surface and subsurface soil samples and groundwater samples to analyze for potential contaminants of concern (PCOC). PCOCs targeted for analysis during the investigation included volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), and lead (Pb). The Phase I and Phase II ESA Reports are listed in Section 7.0 (References).

2.3 Source, Nature, and Extent of Contamination

The presence of petroleum contamination at the LPCH site is likely due to careless filling of the aboveground storage tank (AST) and unauthorized disposal of chemical contaminants within the vertically-buried corrugated metal pipes (CMPs). Sampling and analysis results for LPCH soils adjacent and subjacent to the AST indicated minimal contamination, with some soils samples exceeding preliminary screening levels for EPH. However, soils surrounding the AST did not exceed risk-based screening levels following fractionation. Lower contaminant concentrations at depth in conjunction with decreased photo ionization detector (PID) field screening levels distal to the AST suggest that contamination surrounding the AST is localized and limited horizontally and vertically. CMP2 surface soil exhibited levels of EPH, VPH, and metals contamination. Only one sample, CMP2-3, exceeded risk-based screening levels for soil contaminants (EPH and lead). Generalized surface soil sampling locations are shown on Figure 2. Subsurface soil samples were collected at the north end of the AST, subjacent to sample site LPCH-AST-S1.

Groundwater sample results for the well sampled (located up-gradient of the off-site USTs and down-gradient of from the AST and culvert wells) were free of any contamination associated with EPH, VPH, and metals analysis. The absence of contamination within the groundwater near the Lodgepole Community Hall suggests that contaminants have not migrated from soils to groundwater.

FIGURE 2. DIAGRAM OF DESIGNATED SOIL SAMPLE LOCATIONS



ACM and LBP were identified within the LPCH at various locations during Phase I sampling activities. ACM contamination within the LPCH is limited to the kitchen sink area (counter tile and black powder coating covering approximately 15.5 ft^2) in the basement of the LPCH. LBP contamination occurs on the first floor of the LPCH, primarily surrounding the stage area, on doors, trim, baseboard, and wall panels. Analytical results for petroleum contaminated soils, ACM, and LBP can be found in the Phase II ESA Report (Portage, 2008).

2.4 Exposure Pathways

Several potential pathways exist concerning human exposure to contaminants present at the LPCH site. Exposure pathways for each contaminated medium are presented in Table 1.

TABLE 1. POSSIBLE CONTAMINANT/HUMAN EXPOSURE PATHWAYS AT THE LPCH SITE

	EXPOSURE PATHWAY		
CONTAMINATED MEDIA	Direct Dermal Contact	Ingestion	Inhalation
Surface Soils	✓	✓	✓
Subsurface Soils	✓	✓	✓
ACM	✓	✓	✓
LBP	✓	✓	✓

The exposure pathways listed in Table 1 relate to existing site conditions and those that may arise during remediation activities. Further discussion of human health and ecological risk are presented in the following sections.

2.4.1 Human Health Risks

Potential human health risk exists via direct dermal contact, ingestion, and inhalation of petroleum contaminated soils. The public accessibility of the site increases opportunity for individuals to come in contact with contaminated soils. The contaminated soils exceeding applicable standards, however, are located at the bottom of CMP2-3, approximately 8 feet below ground surface, minimizing the opportunity for accidental exposure to the contaminated soils. The openings to the CMPs are currently covered, preventing access. During remediation activities, primarily excavation and disposal of contaminated soils, increased exposure risk will arise due to unearthing of additional contaminated soils and likely generation of dust.

The ACM and LBP within the LPCH present human health risk via dermal contact, direct ingestion, and inhalation of particulate matter. Public accessibility to the interior of the LPCH is limited by barricading of entrances by the property owner. Limited access does remain through broken windows near the basement, which could lead to direct access of the kitchen, the location of identified ACM hazards. If individuals are able to gain access to the structure, the open, undivided floor plan would allow for access to all other areas of the facility, including those containing LBP. The ACM and LBP are currently in undisturbed conditions, reducing the risk associated with inhalation of particulate matter. If activities take place within the LPCH that may disrupt existing conditions, exposure risks may increase, including those relating to friable asbestos. Significant exposure risk will also be present during demolition and disposal of contaminated media. Individuals conducting remedial actions must be appropriately trained and safeguarded.

2.4.2 Ecological Risks

Ecological risk due to the presence of contaminated soils does not exist unless considering the possible continued migration of contaminants through the vadose zone into the groundwater, and eventually to surrounding surface waters. In this case, potential receptors may include aquatic and riparian plant species as well as vertebrate and invertebrate species within Lodgepole Creek. Deleterious effects due to the ingestion of contaminated water, or toxic bioaccumulation through

consumption of aquatic or riparian vegetation by terrestrial species is highly unlikely. Currently, no evidence exists supporting the migration of contaminants to the groundwater, as supported by groundwater samples taken from Groundwater Well #2 which is down-gradient of identified soil contamination contained within CMP-1 and CMP-2. Table 2 illustrates the potential risk of contaminant migration from soils to groundwater. Values shown in red exceed EPA Region 9 Preliminary Remediation Goals for Soil Screening Levels - Migration to Groundwater. Only those contaminants common to the EPA Region 9 PRG SSL and to the Massachusetts Department of Environmental Protection "Method for Determination of Volatile Petroleum Hydrocarbons (VPH)", January 1998 have been included within Table 2. No exceedances related to EPH contaminant migration from soil to groundwater are present at the LPCH site.

TABLE 2. LPCH RISK FOR CONTAMINANT MIGRATION TO GROUNDWATER (MG/KG)

	EPA Reg 9 PRG SSL*	LPCH-CMP2-3	LPCH-CMP1-3	LPCH-CMP1-4
Benzene	0.002	**<0.1**	**<0.03**	**<0.04**
Ethylbenzene	0.7	<0.25	<0.06	<0.07
Toluene	0.6	<0.25	<0.06	<0.07
Xylenes	10	<0.75	<0.19	<0.22

* Dilution Attenuation Factor of 1 used for comparison purposes due to site characteristics (most conservative value).

2.5 Applicable Laws, Regulations, and Cleanup Standards

Applicable laws and cleanup standards relevant to petroleum contaminated soils, ACM, and LBP are discussed in this section.

2.5.1 Petroleum Contaminated Soils

The Administrative Rules of Montana (ARM 17.56.602 – 605), Montana Code Annotated (MCA 75-11-14), and the Montana DEQ Tier 1 Risk Based Corrected Action Guidance provide advisory standards for petroleum releases occurring in Montana. The Montana Tier 1 Risk Based Corrective Action Guidance for Petroleum Releases is applicable to petroleum releases addressed by DEQ's Leaky Underground Storage Tank (LUST) Brownfields Section, Petroleum Technical Section and Enforcement Division, and by DEQ's Remediation Division under the Water Quality Act. All standards used for the evaluation of contamination and clean-up levels are subject to the approval of the FBIC.

Risk-Based Corrective Action cleanup goals can be met by removing petroleum contaminated soils from the LPCH site until contaminant of concern concentrations meet the Montana DEQ Tier 1 cleanup levels. The following table outlines the contaminants that exceed the Montana DEQ Tier 1 standards at the LPCH site, and the cleanup concentrations that must be met in order to effectively remediate the contaminated soils.

TABLE 3. SAMPLE EXCEEDANCES VS. MT DEQ TIER 1 RISK BASED SCREENING LEVELS

Contaminant	Sampled Value	*MT DEQ RBSL (Surface Soil)*	*MT DEQ RBSL (Subsurface Soil)*
Benzene	< 0.1 mg/kg	0.05 mg/kg	0.05 mg/kg
Benzo(a)pyrene	< 0.11 mg/kg	0.08 mg/kg	3 mg/kg
Unadjusted C11-C22 Aromatics	170 mg/kg	70 mg/kg	100 mg/kg

* Only sample LPCH-CMP2-3 exceeded MT DEQ Tier 1 Risk Based Screening Levels. Only the most conservative screening levels are shown.

Complete laboratory reports, containing all numeric values corresponding to soil contaminants that were sampled for at the LPCH, including EPH, VPH, Pb, and associated constituents, can be found in the Phase II ESA Report (Portage, 2008).

2.5.2 Asbestos Containing Materials

Asbestos related projects in the state of Montana are generally governed by the Asbestos Control Act and the Asbestos Control Program, each of which is administered by the MT DEQ. The Asbestos Control Act requires the department to establish rules governing the review and issuance of asbestos project permits, facility and annual asbestos permits, asbestos-related accreditations, asbestos training course provider approval and the courses taught. The DEQ is also responsible for establishing asbestos abatement work practices, penalties, injunctions, cleanup orders, emergency actions, and inspection procedures. The Asbestos Control Program provides the DEQ a platform to administer and enforce the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP). NESHAP contains standards that regulate building demolitions and renovations, asbestos disposal sites, and other sources of asbestos emissions (specifically those listed in 40 CFR Sections 61.140, 61.141, 61.145 and 61.150 of Subpart M).

Additional standards that apply to asbestos include the Asbestos Hazard Emergency Response Act (AHERA, Subpart E, specifically sections 763.85 – 763.90), which is outlined in Title II of the Toxic Substances Control Act (TSCA), and the Clean Air Act (CAA). Asbestos inspections are required under the Administrative Rules of Montana (ARM 17.74.354) to determine if ACM are present prior to renovation or demolition.

The *Montana Asbestos Work Practices and Procedures Manual* (Manual) identifies practices and procedures that satisfy the DEQ's requirements for inspecting asbestos, conducting asbestos projects, and clearing asbestos projects, and is incorporated and adopted by reference in the Administrative Rules of Montana, Title 17, Chapter 74, Subchapter 3. General procedures and requirements outlined in the Manual for work relating to asbestos are summarized in Table 4.

TABLE 4. GENERAL PROCEDURES AND WORK PRACTICES FOR ASBESTOS RELATED DEMOLITION AND RENOVATION PROJECTS.

Inspection	A DEQ accredited asbestos inspector shall visually inspect site to identify suspect areas of ACM, determine friability, and obtain samples as outlined in the Manual.
Analysis	Ensure that samples are analyzed by laboratories demonstrating proficiency by current successful participation in a nationally recognized testing program, provide a detailed laboratory report, and characterize suspected ACM.
Report	Report findings in a written report to the building owner which includes: site of inspection, scope and purpose, date, inspector's accreditation number and signature, suspect ACM inventory, sample locations, ACM locations and type, locations of friable ACM, and a complete copy of the laboratory report.
Project Permit and NESHAP Notification	The building owner or asbestos project contractor must apply for an abatement permit from the Asbestos Control Program, as well as submit a project design written by a DEQ accredited asbestos project designer; a list of accredited asbestos project workers and contractors/supervisors; a copy of the abatement contract; and a fee based on the abatement contract cost.
Gross Removal and Containment	The following sections of the Manual must be fully addressed during removal and containment actions: work area preparation, decontamination unit, safe work practices, cleaning, removal using a glove-bag, mini-enclosures, enclosures, encapsulation, dismantling of piping and ductwork, demolition, tunnels and crawl spaces, transportation, and disposal.
Final Visual Inspection / Final Air Clearance Sampling & Testing	Final completion of an asbestos project is based on successfully fulfilling the criteria of a final visual inspection and air clearance sampling and testing. Refer to section 6.01 – 6.10 of the Manual for complete descriptions regarding these activities.

Asbestos mitigation must be conducted in accordance with Occupational Safety and Health Administration (OSHA) asbestos regulations (29 CFR Section 1926.1101) to protect asbestos abatement workers. Two short-term standards have been established by OSHA to limit exposures of workers to asbestos, including a short-term exposure limit (STEL) and time weighted average permissible exposure level for an eight-hour period (TWA - PEL):

- STEL = 1.0 fibers per cubic centimeters (f/cm^3) as detected using phase-contrast microscopy (PCM)
- TWA - PEL = 0.1 fibers per cubic centimeters as detected using phase-contrast microscopy

EPA AHERA required clearance sampling levels following abatement activity (40 CFR 763) include:

- PCM clearance criteria: 0.01 f/cm^3
- Transmission Electron Microscopy (TEM) clearance criteria: 70 structures/mm^2 on the filter, or no significant increase from exterior air sample results

2.5.3 Lead Based Paints

USEPA adopted standards January 5, 2001 (40 CFR Part 745) regarding dangerous levels of lead in pre-1978 housing and children-occupied buildings based upon the authority of TSCA Section 403, as amended by the Residential Lead-Based Paint Hazard Reduction Act of 1992 (also known as Title X).

According to this standard, lead is considered a hazard if contaminant levels are greater than:

- 40 µg/ft^2 of lead in dust on floors;
- 250 µg/ft^2 of lead in dust on interior window sills; and
- 400 ppm of lead in bare soil in children's play areas or 1,200 ppm average for bare soil in the rest of the yard.

The Occupational Safety and Health Administration has published regulations regarding worker safety during activities involving LBP abatement. The Construction Standards (29 CFR Part 1926) and the Occupational Safety and Health Standards (29 CFR Part 1910, 1926.62, and 1910.1025) set permissible exposure limits for lead construction workers performing demolition, salvage, or renovation of lead containing materials at 50 ug/m^3 (contamination per air volume), over an 8-hour period.

Prior to commencement of lead based paint abatement activities contracted professionals must be trained and certified according to *Training and Certification Program for Lead-Based Paint Activities in Target Housing and Child Occupied Facilities - Section 402/404* (TSCA, 2006).

RCRA Subtitle C specifies that material containing or surfaced with LBP from commercial buildings may be classified as hazardous waste if lead concentrations exceed the Toxicity Characteristic Rule (40 CFR 261.24, 40 CFR 262.11) concentration limit of 5.0 mg/L in samples prepared according to the Toxicity Characteristic Leaching Procedure (TCLP), and also exceed the conditionally exempt waste generation quantity of 220 pounds. (Note: it is not expected that LBP waste from the LPCH will exceed 220 pounds.) In the case that a waste generator produces greater than 220 pounds of LBP waste that exceeds the TCLP, the generator is required to declare themselves as a small quantity waste generator. If the LBP material can be characterized as a hazardous waste, then additional measures must be taken during abatement activities, primarily completion and submission of a RCRA Subtitle C Site Identification Form, which provides notification of regulated waste activities and other general information regarding the site, owner, and quantities of waste to be generated.

2.5.4 Demolition, Renovation, and the Clean Air Act

Demolition and renovation of facilities containing asbestos is regulated by 40 CFR Chapter I, Part 61 Section 145: Standard for Demolition and Renovation. This section provides complete descriptions of applicability, notification requirements, and procedures. The *Montana Asbestos Work Practices and Procedures Manual*, as mentioned in Section 2.5.2, defines work practices and control measures applicable to asbestos abatement activities that are necessary at the LPCH site.

To protect against the risk associated with LBP, EPA issued the *Lead Renovation, Repair, and Painting Program* as part of 40 CFR Part 745, on March 31, 2008. This rule requires the use of lead-safe practices during demolition and renovation activities aimed specifically at preventing lead poisoning. Beginning in April 2010, all contractors performing these activities in facilities constructed prior to 1978 must be certified and follow specific work practices. Beginning in

December 2009, the rule will require contractors to provide a lead hazard information pamphlet to owners and occupants of facilities undergoing renovation activities constructed prior to 1978.

The Clean Air Act (CAA) requires the EPA to set National Ambient Air Quality Standards (NAAQS, 40 CFR Part 50) for pollutants considered harmful to public health and the environment. The EPA Office of Air Quality Planning and Standards has set NAAQS for six criteria pollutants. Although the list does not contain asbestos, three of the pollutants directly apply to work that must be conducted at the LPCH site. Table 5 summarizes these pollutants. In general, efforts should be made to minimize the generation of dust during demolition and renovation activities.

TABLE 5. NATIONAL AMBIENT AIR QUALITY STANDARDS OF CRITERIA POLLUTANTS FOUND AT THE LPCH.

Pollutant	Primary Standards	
	Level	**Averaging Time**
Lead	1.5 μg/m^3	Quarterly Average(1)
Particulate Matter (PM_{10})	150 μg/m^3	24-Hour(2)
Particulate Matter ($PM_{2.5}$)	15.0 μg/m^3	Annual Arithmetic Mean(3)
	35 μg/m^3	24-Hour(4)

(1) Not to exceed the average of four quarterly readings.
(2) Not to be exceeded more than once per year on average over 3 years.
(3) To attain this standard, the 3-year average of the weighted annual mean concentrations from a single or multiple community-oriented monitors must not exceed 15.0 μg/m^3.
(4) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35μg/m^3.

2.5.5 Transportation and Disposal

Transportation and disposal of asbestos waste must be conducted by a DEQ accredited asbestos project worker or asbestos project contractor or supervisor. A Waste Shipment Record (40 CFR Part 61 Subpart M) from the waste generator (owner or project contractor) must be acquired and verified for all RACM transported off the abatement site. *The Montana Asbestos Work Practices and Procedures Manual* provides guidance for transportation of asbestos waste, including proper containerization methods, placarding, storage, vehicle operation and escort, as well as retention of handling responsibility. Disposal of asbestos must take place at a DEQ approved asbestos disposal site (i.e., Hill County Landfill). The operator of the disposal site must acquire the Waste Shipment Record from the transporter and verify all information. Prior to waste acceptance and subsequent disposal, the operator must ensure that the asbestos material is adequately wet, containerized, and placarded. Copies of all Waste Shipment Records should be kept by both the transporter and disposal operator, and must be furnished to the DEQ upon request.

EPA's policy statement allows contractor-generated LBP waste to be disposed of as household waste in a municipal solid waste landfill or construction and demolition landfill. The EPA encourages individuals to follow several common sense measures during demolition and transportation activities, including proper collection of paint chips and dust, storage and transportation of contaminated media in appropriate containers, and disposal at an appropriate facility. TSCA (Sections 402 and 404) contains training and certification requirements that contractors should learn and follow. In the case that the LBP contaminated media within the

LPCH exceeds the TCLP and/or the conditionally exempt waste generator quantity (220 pounds), the waste must be treated and disposed of as a hazardous waste. In that case the owner or certified contractor must submit notification of regulated waste activity and complete a hazardous waste transporter registration form.

The MT DOT suggests that transporters of demolition waste containing hazardous materials meet the following requirements:

- Provide EPA Waste Manifest/Shipping Papers;
- Have immediately available relevant Emergency Response Information;
- Properly Package, Mark, Label, and Placard all Wastes; and
- Be sufficiently Trained, Licensed, and Endorsed to Transport Waste.

United States 49 CFR Chapter I Part 173 provides additional information regarding packaging of lead (173.155, 173.213, and 173.240) and asbestos (173.155, 173.216, and 173.240).

2.5.6 Historic Preservation

Because the LPCH is listed on the Register of Historic Places, the project demands additional attention when considering abatement of the site. Of the three contaminants present at the site (soils, ACM, and LBP), only abatement of LBP contaminated building materials may prove significant when attempting to perform remedial activities in a historically sensitive manner. Generally, the State Historic Preservation Office (SHPO) prefers to preserve historically significant buildings and associated features when practical. To accommodate the SHPO, cleanup alternatives will be presented in Section 4.0 that aim to preserve significant materials that are contaminated with LBP (trim, baseboard, etc.) in place and undamaged while meeting cleanup alternatives.

3.0 IDENTIFICATION OF CLEANUP ALTERNATIVE OBJECTIVES

Cleanup alternative objectives (CAO) are media-specific goals that are established to protect human health and the environment. The specific components are defined in section 3.1 through 3.3. Selection of a course of action is accomplished by a series of steps designed to reduce potential alternatives to a group of viable alternatives. The development of alternatives includes consideration of the contaminants of concern, associated media, potential exposure pathways, and potential receptors. The CAOs of the LPCH are as follows:

- Eliminate potential hazards to human health and the environment by abating site contamination;
- Minimize potential health hazards to onsite personnel performing remediation actions;
- Provide adequate clean-up and removal for implementation of complete site reuse goals; and,
- Comply with location and action specific laws, regulations, and standards when evaluating cleanup action alternatives and implementing the selected cleanup alternative.

3.1 Determination of Removal Scope

The primary purpose of the abatement action is to mitigate potential human health and environmental risks posed by contaminants located within the LPCH site building and surrounding soils.

3.2 Determination of Removal Schedule

The schedule for abatement activities will be determined by the Fort Belknap Environmental Protection Department with input from EPA and Portage. The removal schedule will be designed within a time frame that ensures adequate protection of public health and the environment, as well as supports the FBIC's overall site restoration goal.

3.3 Planned Remedial Activities

Planned remedial activities are intended to reduce risk associated with identified contamination to levels below applicable regulatory standards. Remedial activities related to contaminated soils include:

- Removal of contaminated soils associated with CMP2.

Remedial activities addressing contamination found within the LPCH include:

- Removal of identified ACM found in the basement kitchen; and
- Abatement of identified LBP, and associated substrates found on the main floor.

4.0 IDENTIFICATION OF CLEANUP ALTERNATIVES

Cleanup alternatives are intended to accomplish the cleanup objectives. Three cleanup alternatives have been considered for this analysis, and are discussed below.

4.1 No-Action with Institutional Controls

A no-action alternative would leave the site in its present condition, allowing all contaminated soils, contaminants located within the LPCH, and physical hazards to remain in place. Institutional controls, inclusive of restrictive fencing, cautionary signage, and public awareness programs would be included in this alternative.

4.2 Removal and Off-Site Disposal of Contaminated Soils, ACM, and LBP

A removal and off-site disposal alternative would allow for the removal of contaminated soils, ACM, and LBP and subsequent transport to and disposal at a permitted facility. Removal of contaminated soils can be accomplished via traditional excavation methods. Backfill would be clean earth fill, placed in a manner that is compatible with the site's surface water drainage. Certified and trained professionals must be contracted to remove ACM from the basement kitchen area as well as LBP from the main floor of the LPCH. Only approved removal practices may be implemented during abatement of ACM and LBP; including, but not limited to pre-cleaning, contaminant isolation and containerization, post-cleaning and clearance sampling, use

of appropriate personal protective equipment and best available technology, and adherence to best management practices.

4.3 Removal and Off-Site Disposal of Contaminated Soils and ACM; Encapsulation of LBP

Like the cleanup alternative discussed in section 4.2, this alternative also proposes to remove and dispose contaminated soils and asbestos containing materials. However, this alternative proposes to encapsulate LBP on surfaces within the LPCH identified as being contaminated during the Phase I ESA sampling effort. Professional contractors must implement safe work practices while conducting remedial activities to ensure the health of workers as well as the environment. Any LBP waste that must be removed from the building shall be done in a manner that preserves the structural and historic integrity of the facility.

5.0 COMPARATIVE ANALYSIS OF CLEANUP ALTERNATIVES

This section evaluates the two cleanup alternatives identified in Section 4.0 based on their effectiveness, implementability, and cost in relation to site-specific conditions. The cleanup alternatives are evaluated to ensure that they effectively meet cleanup alternative objectives.

5.1 No-Action with Institutional Controls Alternative

5.1.1 Effectiveness

Effectiveness of the *No-Action alternative with Institutional Controls* would be minimal. The no-action alternative does not achieve the primary objectives of the planned remedial activities, nor support the ultimate future reuse goals for the site as expressed by the FBIC. All contaminants would remain in place on the site, posing long-term threats to human health and the environment. Future exposure to contamination due to failed implementation of institutional controls or other means warrants consideration of an alternative that addresses the primary cleanup objectives.

5.1.2 Implementability

Implementation of the *No-Action with Institutional Controls* would be easily accomplished. The entire LPCH site would be left in its current condition, leaving all contaminants in place. The general purpose of selected institutional controls would be to provide sufficient awareness of hazards associated with the site as well as prevent public access. Such controls may include public awareness programs, cautionary signage, and physical barriers including fencing and secure barricades of all possible entrance points to the LPCH. All controls would become associated with the property deed and would require periodic inspection of the property to evaluate effectiveness and the necessity of corrective actions.

5.1.3 Cost

Costs relating to the *No-Action alternative with Institutional Controls* would consist of site maintenance, monitoring, and staff training or augmentation. One competent individual would be required to perform all necessary tasks associated with this alternative at a cost which may

exceed $5,000 per year. Construction of fences and addition of barricades, posting of signage, and implementation and conductance of a public awareness programs could result in an additional annual expenses of $5,000. Large, long-term expenses would eventually incur due to continued implementation of institutional controls and possible liability issues associated with site safety and potential unidentified human health and environmental impacts. All costs related to the No-Action alternative would increase over time due to continued facility degradation.

5.2 Removal and Off-Site Disposal of Contaminated Soils, ACM, and LBP

5.2.1 Effectiveness

Removal and Off-Site Disposal of Contaminated Soils, ACM, and LBP would serve to mitigate all contamination concerns associated with the LPCH site. Removal and off-site disposal of contaminants addresses the primary site cleanup objectives, effectively eliminating human and environmental risk associated with identified contaminated media.

5.2.2 Implementability

Implementation of the *Removal and Off-Site Disposal* alternative would be performed by licensed and certified contractors. Excavation and disposal of approximately 40 cubic yards soils surrounding CMP-2 would be necessary in order to effectively remove soil contamination. Approximately 15.5 ft^2 of ACM located within the basement kitchen, as well as 268 linear feet of trim, baseboard, and casing, 182 square feet of wall paneling, and the primary entrance door, all coated with or containing LBP would be removed. Based on their waste acceptance criteria, all contaminated materials (soils, ACM, and LBP) may be disposed of at Hill County Landfill (RCRA Subtitle D), located 70 miles northwest of the site.

5.2.3 Cost

Costs associated with the *Removal and Off-Site Disposal* alternative total $37,828. Costs associated with contaminated soils, ACM, and LBP, are itemized, in general, as follows:

- Contaminated Soils Removal = $10,200
- Asbestos Containing Materials = $13,295
- Lead Based Paint = $14,334

Costing estimates of this alternative include excavation, demolition, transportation and disposal fees, labor, materials and equipment, supervision, engineering, and contingencies. A preliminary cost estimate for the *Removal and Off-Site Disposal of Contaminated Soils, ACM, and LBP* alternative can be found in Attachment A.

5.3 Removal and Off-Site Disposal of Contaminated Soils and ACM; Encapsulation of LBP

5.3.1 Effectiveness

The *Removal and Off-Site Disposal of Contaminated Soils and ACM; Encapsulation of LBP* alternative effectively serves to mitigate all contamination concerns associated with the LPCH

site. Removal and off-site disposal of contaminated soils, coupled with encapsulation of LBP addresses the primary site cleanup objectives of eliminating human and environmental risks associated with exposure to contaminated media. This alternative does, however, leave LBP in place on the site, presenting limited risk of future exposure to contamination.

5.3.2 Implementability

Implementation of this cleanup alternative would be performed by licensed and certified contractors. Excavation and disposal of approximately 40 cubic yards of soils surrounding CMP-2 would be necessary in order to remove soil contamination; in addition to the removal and disposal of approximately 15.5 ft^2 of ACM located within the basement kitchen. Approximately 268 linear feet of trim, baseboard, and casing, 182 square feet of wall paneling, and the primary entrance door, all coated with or containing LBP on the main floor would require encapsulation. Limited removal of LBP may be necessary to prepare the surface of materials for encapsulation. In these instances, care should be taken to prevent damage to the substrate and to limit the amount of dust and waste produced during these activities. Based on their waste acceptance criteria, all contaminated materials (soils, ACM, and any LBP waste that may be generated) may be disposed of at Hill County Landfill (RCRA Subtitle D), located 70 miles northwest of the site.

5.3.3 Cost

Total cost of the *Removal and Off-Site Disposal of Contaminated Soils and ACM; Encapsulation of LBP* alternative is $35,760**.** Abatement costs associated with contaminated soils, ACM, and LBP for this cleanup alternative are as follows:

- Contaminated Soils Removal = $10,200
- Asbestos Containing Materials = $13,295
- Lead Based Paint = $12,266

Costing estimates of this alternative include excavation, demolition, transportation and disposal fees, labor, materials and equipment, supervision, engineering, and contingencies. A preliminary cost estimate for the *Removal and Off-Site Disposal of Contaminated Soils and ACM; Encapsulation of LBP* alternative can be found in Attachment B.

The advantages and disadvantages of each of the cleanup action alternatives are summarized in Table 6.

TABLE 6. COMPARISON OF CLEANUP ALTERNATIVES

	EVALUATION PARAMETER		
CLEANUP ALTERNATIVE	Effectiveness	Implementability	Cost
No-Action, Institutional Controls	**Low** – Fails to Meet Cleanup Action Objectives	**High** – Easily Implemented, Training Required for Staff	**Unknown** - Potential for High Long Term Costs Exist.
Removal and Off-Site Disposal of all Contaminants	**High** – Meets Cleanup Action Objectives, does not preserve complete Historic value of structure	**Moderate** – Requires Trained Professionals to Complete Abatement Activities	**Moderate** – Costs Incurred During Abatement Activities, No Long Term Costs Associated with this Alternative.
Removal and Off-Site Disposal of Contaminated Soils and Asbestos; Encapsulation of LBP	**High** – Meets Cleanup Action Objectives (leaves LBP in place), as well as preserving Historic value	**Moderate** – Requires Trained Professionals to Complete Abatement Activities	**Moderate** – Costs Incurred During Abatement Activities, No Long Term Costs Associated with this Alternative.

6.0 RECOMMENDED CLEANUP ALTERNATIVE

This section discusses recommended cleanup alternatives based upon current and available information as well as suggests optional cleanup measures that may further the effectiveness of mitigation efforts and promote the future site reuse goals.

6.1 Recommended Cleanup Alternative

The *No Action with Institutional Controls* alternative does not sufficiently address the cleanup action objectives for the remediation of the LPCH, and is therefore not a viable cleanup alternative. Currently there is not sufficient information to recommend which of the remaining cleanup alternatives should be implemented at the LPCH site. Both the *Removal and Off-Site Disposal of Contaminated Soils, ACM, and LBP* alternative and the *Removal and Off-Site Disposal of Contaminated Soils and ACM; Encapsulation of LBP* alternative meet the cleanup objectives presented within this report. Implementation of either cleanup alternative will require limited institutional controls, specifically prior to and during abatement activities, consisting of cautionary signage and a public awareness program. Each cleanup alternative complies with all laws and regulations and is suited to meet regulatory cleanup standards as mentioned in section 2.5. Both suggested alternatives have the potential to address the historic needs of the facility renovation. If the LBP contaminated media is to be removed from the site and disposed of, a replacement material representative of the era and material must be selected that preserves the historic nature of the facility. In the case of encapsulation, all building materials with historic significance will remain in place. The effectiveness, implementability, and costs associated with each alternative meet the needs of the FBIC, while abating on-site contamination and providing substantial progress in meeting the future site reuse goals.

6.2 Optional Cleanup Measures

The addition of optional measures for removal of physical hazards and possibly contaminated soils would further the effectiveness of mitigation efforts, reducing future possible human health and environmental risks while promoting site reuse objectives. These optional measures would include:

- Removal of the AST, footings, and associated contaminated soils and piping leading to the LPCH; and
- Removal of CMP-1 and associated contaminated soils.

Soils need only be removed if contamination is present, as evidenced by PID field screening or visual confirmation.

It is practical and prudent to include the additional optional cleanup measures with the selected cleanup alternative. Conducting the additional abatement actions would increase the effectiveness of the cleanup alternative, removing current and possible future human health and environmental hazards associated with the site.

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